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REMARKS/ARGUMENTS

Claim Rejections – 35 U.S.C. 112

The Examiner rejects claim 17 contending that this claim does not set forth any steps involved in the method/process. In response, claim 17 has been amended so as to recite "correlating a soft data element decision sequence with a second data element sequence to generate a channel quality indicator [emphasis added]". Applicant submits that claim 17 as amended recites all necessary steps involved in the method.

Claim Rejections - 35 U.S.C. 103

The Examiner rejects claims 1, 4, 7, 11, 14, 17 and 36 under 35 U.S.C. 103(a) as being unpatentable over United States Patent US 6,611,513 ("ten Brink") in view of United States Patent US 6,175,590 ("Stein"). In response, Applicant respectfully traverses the Examiner's rejection, as the Examiner has failed to meet the requirements to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Applicant's analysis below demonstrates that the Examiner has not satisfied these three basic criteria.

Requirement to Teach or Suggest All Claim Limitations

The Examiner contends that Stein teaches "a correlator, receiving as input sequence of soft data element decisions produced by the symbol de-mapper [emphasis added], and the re-encoded output sequence produced by the encoder, said correlator being adapted to produce a channel-quality indicator output [emphasis added] by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence" in column 3, lines 1-16. Applicant respectfully disagrees with the Examiner. With reference to Figure 2,

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Stein teaches in column 5, lines 4-9 that "the re-ordered symbols are provided to symbol re-combiner 218 which recombines R_{rx} symbols, where R_{rx} denotes the rate hypothesis being decoded by receiving system 200". Accordingly, Applicant submits that data fed into the next stage containing the symbol metric table 220, the decoder 230, the re-encoder 236, the delay element 232 and the correlator 234 is in the form of re-combined <u>symbols</u> from a symbol re-combiner, and not <u>soft data element decisions</u> from a symbol de-mapper. Applicant submits that components 210, 212, 214, and 216 are not demappers. For example, Stein teaches that the demodulator 214 may be a CDMA demodulator (see col. 4, lines 56-67); however, this is completely different than a symbol demapper. It can be seen that Stein and the present invention operate differently.

In column 5, lines 14-18, Stein teaches that "in the exemplary embodiment, the demodulated soft frame symbols from symbol recombiner 218 comprises 4-bit symbols for full rate, 5-bit symbols for half rate, 6-bit symbols for quarter rate, and 7-bit symbols for eight rate". Later in column 6, lines 15-18, Stein teaches "for each symbol in the frame, correlator 234 multiplies a re-encoded symbol with a demodulated and delayed soft frame symbol and accumulates the resultant product". Stein teaches in column 6, lines 27-30 that "Correlator 234 generates four correlation values: $corr(x_0, y_0)$, $corr(x_1, y_1)$, $corr(x_2, y_2)$, and $corr(x_3, y_3)$ for the full, half, quarter, and eighth rates, respectively, for each received data frame". Stein teaches that based on the correlation values, "rate selector 250 determines which of the four rates that currently received frame was sent" in column 6, lines 33-34.

By contrast, the present application teaches that "in developing the CQI [i.e. Quality Channel Indicator], a soft output from a de-mapping function is used to obtain a measurement of channel quality, <u>since the amplitude of the soft output can be used as an indication of the confidence of the signal</u> [emphasis added]" on page 17, lines 6-9. Accordingly, the correlator of the present application is adapted to "produce a channel quality indicator output by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence". Stein teaches away from using the amplitude of a soft output from a de-mapping function since the symbol recombiner 218 recombines R_{rx} symbols.

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For at least the aforementioned reasons, Applicant submits that the Examiner has failed to demonstrate that the prior art references teach all of the claim limitations recited by claim 1 of the present application. Therefore, Applicant respectfully submits that the requirement of teaching all limitations of the claim for establishing a *prima facie* case of obviousness has not been satisfied for claim 1.

Requirement to Establish Motivation to Combine References

Applicant notes that Section 2143.01 of the Manual of Patent Examining Procedure (MPEP) sets out three possible sources of motivation to combine, namely A) the nature of the problem to be solved, B) the teachings of the prior art, and C) the knowledge of persons of ordinary skill in the art. It is respectfully submitted that the Examiner has not established a motivation to combine the references from any one of the three sources.

A. The Nature of the Problem to be Solved

The problem to be solved in ten Brink is recited in column 3, lines 27-33. Ten Brink states that "the conventional CDMA and M-CDMA system as described above does not allow for bit error rate (BER) reduction e.g. through iterative decoding". Ten Brink further states that "there is thus a requirement for a CDMA or M-CDMA system in which an improved BER may be achieved". By contrast, the problem to be solved in Stein is "determining the data rate of received data in a variable rate communication system", as recited in column 1, lines 41-42. Applicant submits that the problem of reducing BER in a CDMA or M-CDMA system is quite different than the problem of determining the data rate of received data in a variable rate communication system. Therefore, Applicant submits that there can be no source of motivation in the problem to be solved by the cited references to combine the cited references. Furthermore, neither reference deals with the problem at hand, namely that of providing a CQI.

B. the Teachings of the Prior Art

There is no teaching, suggestion, or motivation to combine ten Brink and Stein in the references themselves. Applicant notes that ten Brink and Stein do not refer to one another in their disclosures. Applicant further notes that the list of references cited in ten Brink does not

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include Stein and vice-versa. Furthermore, ten Brink and Stein have different International and United States classifications. Accordingly, Applicant submits that there is no suggestion in the cited references to combine the disclosures of ten Brink and Stein.

C. the Knowledge of Persons of Ordinary Skill in the Art

As clearly stated *In re Kotzab*, 55 USPQ2d 1313, 1318 "Identification of prior art statements that, in abstract, appear to suggest claimed limitation does not establish prima facie obviousness without a finding as to specific understanding or principle within knowledge of skilled artisan that would have motivated one with no knowledge of invention at issue to make combination in manner claimed" [emphasis added]. Applicant submits that the Examiner has not demonstrated suggestion in the knowledge of persons of ordinary skill in the art to combine ten Brink and Stein in the manner claimed. Claim 1 recites features not found in ten Brink or Stein, yet the Examiner has not demonstrated any specific understanding or principle within knowledge of a skilled artisan that would suggest combining ten Brink and Stein in a manner that would arrive at such features of claim 1.

As clearly stated *In re Fine*, 5 USPQ2d 1596, 1600 "Patent and Trademark Office improperly rejected claimed invention for obviousness... since PTO therefore failed to satisfy its burden of establishing prima facie case of obviousness by showing some objective teaching or generally available knowledge that would lead one skilled in the art to combine teachings of existing references". Since the Examiner has not demonstrated an objective teaching or generally available knowledge that would lead one skilled in the art to combine ten Brink and Stein in a manner that would arrive at the claimed invention, Applicant submits that the Examiner has not fulfilled his burden of establishing motivation to combine references for establishing a *prima facie* case of obviousness.

Applicant submits that there can be no motivation to combine ten Brink and Stein, as such a combination renders ten Brink and Stein unsatisfactory for their intended purpose. Under section 2142.01 of the MPEP, "if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification". Applicant submits that the Examiner has not conformed to

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this.

As previously discussed, Stein teaches a symbol recombiner which "recombines R_{rx} symbols, where R_{rx} denotes the rate hypothesis being decoded by receive system 200". Substituting the symbol recombiner 218 with a symbol de-mapper would render the receiver and Stein unsatisfactory for its intended purpose. Applicant submits that the receiver in Stein relies on the symbol recombiner 218 to output symbols in accordance with a rate hypothesis so that a correlation can be made in order to determine if the rate hypothesis is correct or not. Replacing the symbol recombiner 218 with a symbol de-mapper is contrary to the teaching of Stein and would not enable the receiver to perform correlations on symbols according to a rate hypothesis to determine the rate of which the data is received.

Similarly, Applicant submits that modifying ten Brink so as to introduce a decoder, a re-encoder and a correlator renders the receiver unsatisfactory for its intended purpose. The receiver of ten Brink relies on a separate set of components as shown in Figure 3 so as to receive CDMA signals while allowing for bit error rate reduction. Applicant submits that the fact that ten Brink teaches a de-mapper is irrelevant to the present application when such de-mapper is user for a completely different purpose. Components such as de-mappers, decoders, re-encoders and correlators may be found in the prior art. However, such components are not found in combination in the manner claimed by the present application.

For at least the aforementioned reasons, Applicant respectfully submits that the requirement of establishing motivation to combine the cited references has now been satisfied for claim 1.

For at least the aforementioned reasons, the Examiner is respectfully requested to reconsider and withdraw the rejection under 35 U.S.C. 103(a) against claim 1.

Applicant submits that claims 2-17, 33 and 36 are patentable over the Examiner's cited art for similar reasons provided above in respect of independent claim 1.

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Claim Rejections – 35 U.S.C. 102

Before setting forth a discussion of the prior art applied in the Office Action, it is respectfully submitted that controlling case law has frequently addressed rejections under 35 U.S.C. § 102. "For a prior art reference to anticipate in terms of 35 U.S.C. Section 102, **every element** of the claimed invention **must** be **identically** shown in a single reference." Diversitech Corp. v. Century Steps, Inc., 850 F.2d 675, 677, 7 U.S.P.Q.2d 1315, 1317 (Fed. Cir. 1988; emphasis added). The disclosed elements must be arranged as in the claim under review. See Lindemann Machinefabrik v. American Hoist & Derrick Co., 730 F.2d 1452, 1458, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). If any claim, element, or step is absent from the reference that is being relied upon, there is **no** anticipation. Kloster Speedsteel AB v. Crucible, Inc., 793 F.2d 1565, 230 U.S.P.Q. 81 (Fed. Cir. 1986; emphasis added). The following analysis of the present rejections is respectfully offered with guidance from the foregoing controlling case law decisions.

The Examiner rejects claims 39-41 under 35 U.S.C. 102(e) as being anticipated by United States publication 2002/0051498 ("Thomas"). In response, Applicant respectfully traverses the Examiner's rejection for reasons detailed below.

Regarding claim 39, the Examiner refers to paragraphs 90 and 91 of Thomas to contend that "Thomas discloses in context of the OFDM transmission of signals, the use of overhead (pilot is generally regarded as part of the overhead) in order to reduce bit count in transmission of signal to the receiver". Applicant respectfully disagrees. Thomas teaches that "the coder adds a redundant bit for every input bit, thereby doubling the number of bits transmitted for a given amount of data" and that "in order to reduce part of this overhead, some of the coded bits may not be transmitted – that is, they may be hard punctured at the transmitter – providing, for example, a resulting ¾ rate code, as is conventional". Thomas teaches that "this hard puncturing operation is performed at the transmitter to allow a higher data rate of transmission at the expense of less redundancy" and that "the hard punctured bits are therefore added to the received bits at the receiver before being passed into the viterbi decoder and decoded as normal ½ rate code". Accordingly, Applicant submits paragraphs 90 and 91 of Thomas relate to data redundancy and reducing data redundancy using hard puncturing. It is unclear how this relates to "the use of overhead (pilot is generally regarded as part of the overhead) in order to reduce bit

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count in transmission of signal to the receiver".

The Examiner concludes, "therefore the claim limitation is properly addressed as disclosed in Thomas, rendering the [Applicant's] argument as moot". However, it is respectfully submitted that such conclusion is not well founded. In particular, even if Thomas were to teach "the use of overhead (pilot is generally regarded as part of the overhead) in order to reduce bit count in transmission of signal to the receiver", it is unclear how this relates to claim 33, which recites "a transmitter adapted to combine pilot and transmission parameter signalling [emphasis added] on a single overhead channel within an OFDM signal".

Applicant submits that Thomas does not teach "a transmitter adapted to combine pilot and transmission parameter signalling [emphasis added] on a single overhead channel within an OFDM signal". Thomas is silent to transmission parameter signalling. Applicant submits that transmission parameter signalling is completely different than the hard puncturing performed in Thomas. Applicant further submits that transmission parameter signalling is completely different than the redundant bits taught by Thomas. Transmission parameter signalling is not a copy of the pilot signalling. Subsequent claims further illustrate this point.

Claim 40 recites that "a set of transmission parameter signalling symbols are transmitted on the overhead channel with strong encoding such that at a receiver, they can be decoded accurately, re-encoded, and the re-encoded symbols treated as know pilot symbols [emphasis added] which can then be used for channel estimation". Accordingly, the receiver becomes aware of known pilot symbols from the transmission parameter signalling. Applicant submits that this is completely different than receiving redundant data bits as is done in Thomas.

Claim 41 recites "compare receive symbols with a known pilot symbol to produce a channel estimate". It is respectfully submitted that Thomas does not produce known pilot symbols and therefore Thomas cannot teach that such know symbols are compared with receive symbols so as to produce a channel estimate.

As stated above, "for a prior art reference to anticipate in terms of U.S.C. Section 102, every element of the claimed invention must be identically shown in a single reference". Since Thomas does not teach transmission parameter signalling, Applicant submits that claims 39-41
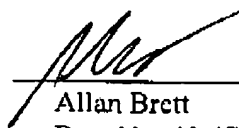
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are not anticipated by Thomas. The Examiner is respectfully requested to reconsider and withdraw the objection.

In view of the foregoing, early favorable consideration of this application is earnestly solicited.

Respectfully submitted,

JIA, Ming et al.

By _____
Allan Brett
Reg. No. 40,476
Tel.: (613) 232-2486 ext. 323

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RAB:PDB:kbc

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